

Claims:

1. A flow control apparatus for use in wellbore operations, comprising:
 - a tubular member having at least one aperture formed in a wall thereof, the aperture providing fluid communication between an outside and an inside of the tubular member;
 - a sleeve disposed radially outward of the tubular member, the sleeve being selectively movable between a first position and a second position to control the flow of fluid between the outside and the inside of the tubular member;
 - a electromechanical device adapted to impart movement to the sleeve; and
 - a control line adapted to supply an electrical current to the electromechanical device.
2. The flow control apparatus of claim 1, wherein the electromechanical device is a motor.
3. The flow control apparatus of claim 2, further comprising teeth formed on the outer surface of the sleeve and a gear coupled to the motor and associated with the teeth of the sleeve.
4. The flow control apparatus of claim 1, wherein in the first position a reduced amount of fluid may flow between the outside and the inside of the tubular member in comparison to the second position.
5. The flow control apparatus of claim 4, wherein in the first position the sleeve covers at least a portion of the at least one aperture of the tubular member.
6. The flow control apparatus of claim 1, wherein the electromechanical device is adapted to rotate the sleeve between the first position and the second position.
7. The flow control apparatus of claim 1, wherein the sleeve has at least one aperture formed in a wall therein and wherein in the second position the at least one

aperture of the sleeve at least partially aligns with the at least one aperture of the tubular member.

8. The flow control apparatus of claim 7, wherein the sleeve has a plurality of different sized apertures.

9. The flow control apparatus of claim 7, wherein the tubular member has a plurality of different sized apertures.

10. The flow control apparatus of claim 1, further comprising a tubular screen disposed around the tubular member.

11. The flow control apparatus of claim 10, wherein the control line is integrated with the tubular screen.

12. A flow control apparatus for use in wellbore operations, comprising:

a tubular member having at least one aperture formed in a wall thereof, the aperture providing fluid communication between an outside and an inside of the tubular member;

a fixed ring and a rotatable ring disposed radially outward of the tubular member, the fixed ring and the rotatable ring having voids formed on an outer surface thereof, the rotatable ring being selectively movable to align the voids of the fixed ring and the rotatable ring to create a passage along the outer surface of the fixed ring and the rotatable ring; and

a chamber in communication with the passage and the aperture of the tubular member.

13. The flow control apparatus of claim 12, further comprising a tubular screen disposed around the tubular member.

14. The flow control apparatus of claim 13, further comprising a motor coupled to the rotatable ring and adapted to move the rotatable ring.

15. The flow control apparatus of claim 14, further comprising a control line adapted to supply an electrical current to the motor.
16. The flow control apparatus of claim 15, wherein the control line is integrated with the screen.
17. A screen for use in wellbore operations, comprising:
 - a plurality of annular ribs having an inner surface;
 - at least one support rod disposed along the inner surface of the annular ribs;
 - at least one control line disposed along the inner surface of the annular ribs;
 - and
 - a perforated inner tube disposed inwardly of the support rod and the control line.
18. The screen of claim 17, wherein the screen surrounds a perforated tubular member.
19. The screen of claim 17, wherein the control line is adapted to supply a hydraulic pressure.
20. The screen of claim 17, wherein the control line is adapted to supply an electrical current.
21. The screen of claim 17, wherein the control line is a communication line.
22. The screen of claim 17, wherein the screen comprises a plurality of control lines, at least one of the control lines being adapted to supply a hydraulic pressure and at least one of the control lines adapted to conduct an electrical current.
23. A system for controlling flow of hydrocarbons in wellbore operations, comprising:

a string of tubing; and
a plurality of flow control apparatuses coupled to the string of tubing,
each flow control apparatus comprising a tubular member having at least one aperture formed in a wall thereof, the aperture providing fluid communication between an outside and an inside of the tubular member, each flow control apparatus adapted to be set in a first position and in a second position to control a flow of fluid between the outside and the inside of the tubular member.

24. The system of claim 23, wherein in the first position a reduced amount of fluid may flow between the outside and the inside of the tubular member in comparison to the second position.

25. The system of claim 24, wherein in the first position the aperture is at least partially closed to restrict flow of fluid therethrough and in the second position the aperture is at least partially open to increase flow of fluid therethrough.

26. The system of claim 23, wherein one or more of the flow control apparatuses are adapted to be set between the first position and the second position by a second tubular member adapted to be disposed in the inner diameters of the tubular members of the flow control apparatuses.

27. The system of claim 23, wherein one or more of the flow control apparatuses are adapted to be set between the first position and the second position by a hydraulic pressure applied to an annular space between the tubing and the wellbore.

28. The system of claim 23, wherein one or more of the flow control apparatuses are adapted to be set between the first position and the second position by at least one control line.

29. The system of claim 28, wherein the at least one control line is adapted to provide a hydraulic pressure.

30. The system of claim 28, wherein the at least one control line is adapted to provide an electrical current.
31. The system of claim 23, wherein one or more of the flow control apparatuses are adapted to be set between the first position and the second position by a plurality of control lines, at least one of the control lines is a fluid control line and at least one of the control lines is an electrical control line.
32. The system of claim 31, further comprising a valve actuated by the electrical control line, the valve when in an open position allows a hydraulic pressure supplied by the fluid control line to be in communication with one or more of the flow control apparatuses.
33. The system of claim 28, further comprising a control panel at the surface of the wellbore coupled to the at least one control line.
34. The system of claim 33, wherein the control panel is adapted to receive communications from a remote location.
35. The system of claim 33, wherein the control panel is adapted to send communications to a remote location.
36. The system of claim 28, further comprising a flow control manifold, the flow control manifold comprising at least one electrical inlet, at least one hydraulic inlet, and a plurality of hydraulic outlets.
37. A method of controlling flow in wellbore operations, comprising:
running in a plurality of flow control apparatuses coupled to a string of tubing, each flow control apparatus comprising a tubular member having at least one aperture formed in a wall thereof, the aperture providing fluid communication between an outside and an inside of the tubular member, each flow control

apparatus adapted to be set in a first position and in a second position to control a flow of fluid between the outside and the inside of the tubular member; and

remotely setting each of the flow control apparatuses in the first position or the second position.

38. The method of claim 37, wherein in the first position a reduced amount of fluid may flow between the outside and the inside of the tubular member in comparison to the second position

39. The method of claim 38, wherein in the first position the aperture is at least partially closed to restrict flow of fluid therethrough.

40. The method of claim 37, wherein setting one of the flow control apparatuses from between the first position and the second position comprises supplying a hydraulic pressure to the one of the flow control apparatuses.

41. The method of claim 37, wherein setting one of the flow control apparatuses from between the first position and the second position comprises supplying an electrical current to the one of the flow control apparatuses.

42. The method of claim 40, wherein supplying a hydraulic pressure is supplied by opening a valve by electromechanical means.

43. The method of claim 42, wherein the valve is a solenoid valve.

44. The method of claim 38, wherein the flow control apparatuses of a formation are set in the second position and wherein the flow control apparatuses of flow control apparatuses removed from the formation are set in the first position to isolation production of hydrocarbons from the formation.

45. The method of claim 38, wherein the flow control apparatuses located at a heel section of a horizontal tubing is set in the first position and wherein the flow

control apparatuses in the toe section of the horizontal tubing is set in the second position.

46. The method of claim 37, wherein setting comprises sending communications from a remote source to a control panel adapted to actuate the flow control apparatuses.

47. The method of claim 38, wherein the flow control apparatuses are set in the first position, the method further comprising performing a gravel packing operation around the flow control apparatuses set in the first position.

48. A remotely operable flow control apparatus for use in wellbore operations comprising:

a tubular member having at least one aperture formed in a wall thereof, the aperture providing fluid communication between an outside and an inside of the tubular member;

a sleeve disposed radially outward of the tubular member, the sleeve being selectively movable between a first position and a second position to control a flow of fluid between the outside and the inside of the tubular member;

a movement imparting member adjacent the sleeve for imparting movement to the sleeve comprising a piston surface, the piston surface adapted to receive a hydraulic pressure to move the sleeve between the first position and the second position, and wherein the hydraulic pressure is supplied by a tubing disposable inside the tubular member.

49. A remotely operable flow control apparatus for use in wellbore operations, comprising:

a tubular member having at least one aperture formed in a wall thereof, the aperture providing fluid communication between an outside and an inside of the tubular member;

a sleeve disposed radially outward of the tubular member, the sleeve being selectively movable between a first position and a second position to control a flow of fluid between the outside and the inside of the tubular member;

a movement imparting member adjacent the sleeve for imparting movement to the sleeve comprising a piston surface, the piston surface adapted to receive a hydraulic pressure to move the sleeve between the first position and the second position, and wherein the hydraulic pressure is supplied by a coiled tubing disposable inside the tubular member.

50. A remotely operable flow control apparatus for use in wellbore operations, comprising:

a tubular member having at least one aperture formed in a wall thereof, the aperture providing fluid communication between an outside and an inside of the tubular member;

a sleeve disposed radially outward of the tubular member, the sleeve being selectively movable between a first position and a second position to control a flow of fluid between the outside and the inside of the tubular member;

a movement imparting member adjacent the sleeve for imparting movement to the sleeve comprising a piston surface, the piston surface adapted to receive a hydraulic pressure to move the sleeve between the first position and the second position, and wherein the flow control apparatus is adapted to receive the hydraulic pressure from an annular space between the flow control apparatus and the wellbore.

51. A remotely operable flow control apparatus for use in wellbore operations, comprising:

a tubular member having at least one aperture formed in a wall thereof, the aperture providing fluid communication between an outside and an inside of the tubular member;

a sleeve disposed radially outward of the tubular member, the sleeve being selectively movable between a first position and a second position to control a flow of fluid between the outside and inside of the tubular member;

PATENT

Attorney Docket No.: WEAT/0117.D1
EV351031521US

a movement imparting member adjacent the sleeve for imparting movement to the sleeve, comprising a piston surface, the piston surface is adapted to receive a hydraulic pressure to move the sleeve;
further comprising a tubular screen disposed therearound;
further comprising a control line integrated with the tubular screen, the control line providing the hydraulic pressure to the piston surface.